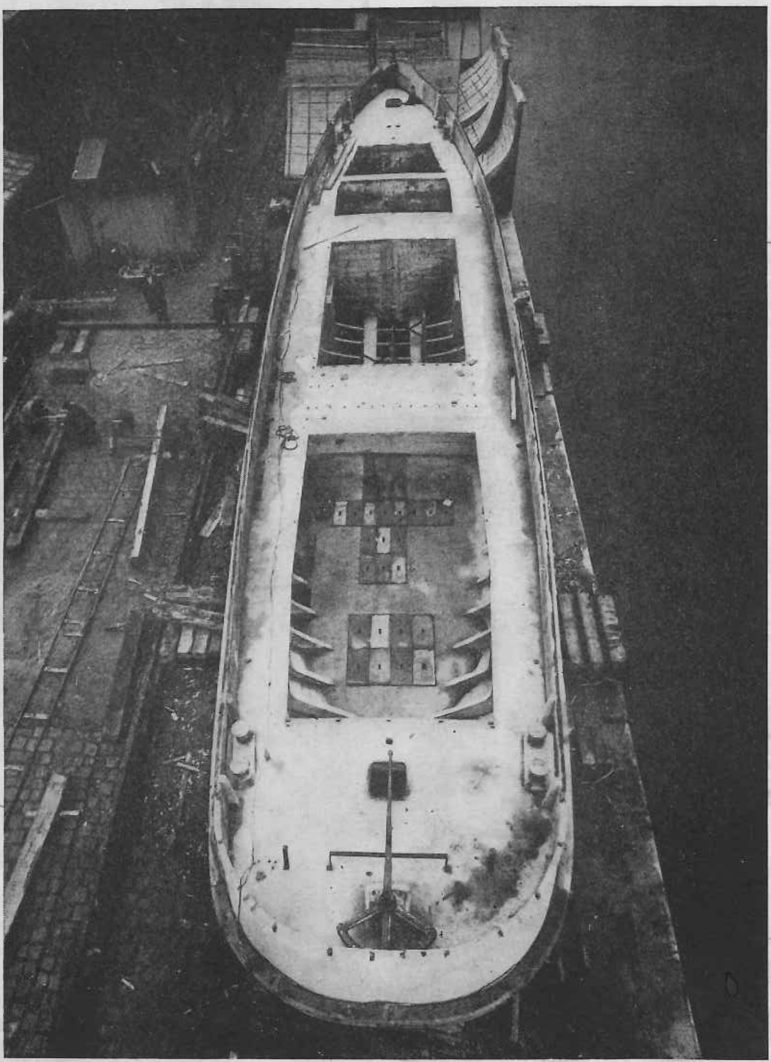
25/130A 425/61 33

More Progress in CONCRETE SHIP CONSTRUCTION



Deck view of concrete ship building in French shipyard

PUBLISHED BY
PORTLAND CEMENT ASSOCIATION

April 1918

T265
Sal 4.17

IF there is one chance in 100 that we shall be short of ships in the next six months, then—

All our country's resources in men;

All our country's resources in material;

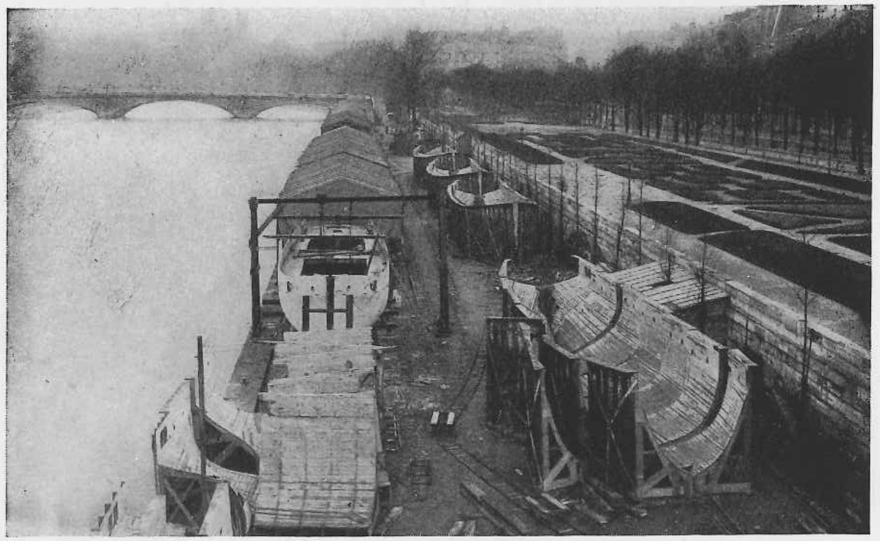
All our country's resources in aiding—

Must go first of all to helping to turn out more ships in the next six months.

Because ships are the bridge over which every soldier we train, every gun we make, every bit of food we save, every supply needed to win the war must go before they can be used.

If the bridge is broken, if there are so few ships that there are gaps in the bridge, then we cannot win.

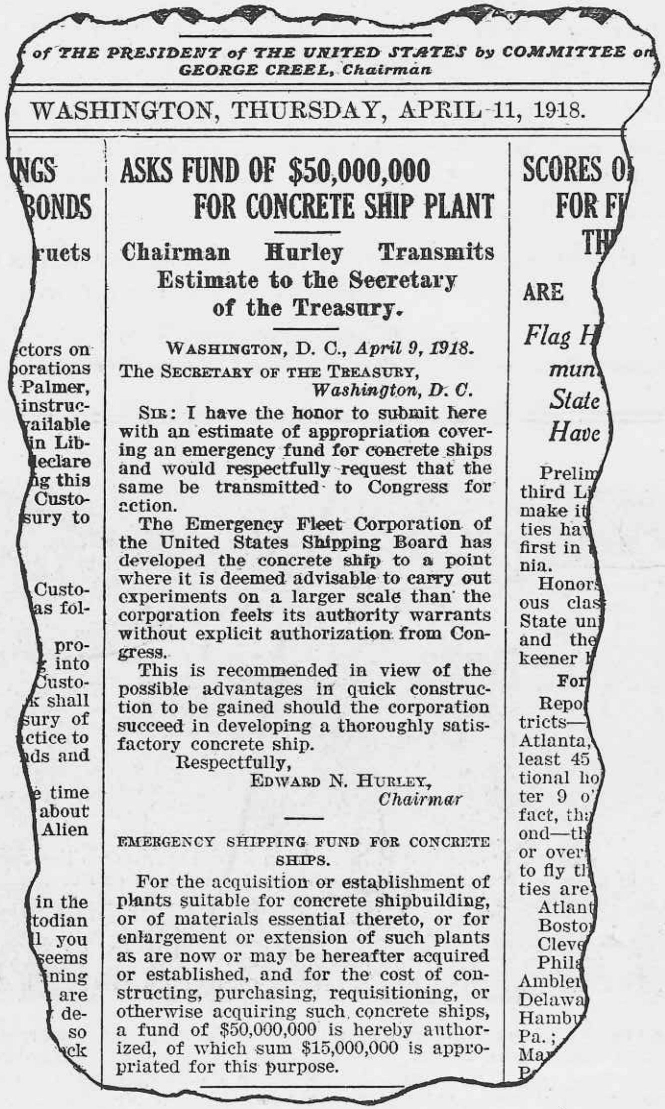
By EDWARD A. FILENE,
Chairman, War Shipping Committee, Chamber of Commerce of the United States



France has begun concrete shipbuilding on a large scale. The above view is in a shipyard somewhere along one of France's inland waterways. A number of boats can be seen in course of construction while in the foreground are views of the sectional molds or forms which illustrate what care has been taken to give these vessels graceful lines. On the cover of this booklet is a view looking down on the deck and into the hold of one of these vessels.

MORE PROGRESS IN CONCRETE SHIP CONSTRUCTION

EMERGENCY FLEET CORPORATION ASKS APPROPRIATION



of THE PRESIDENT of THE UNITED STATES by COMMITTEE on
GEORGE CREEL, Chairman

WASHINGTON, THURSDAY, APRIL 11, 1918.

ASKS FUND OF $50,000,000 FOR CONCRETE SHIP PLANT

Chairman Hurley Transmits Estimate to the Secretary of the Treasury.

WASHINGTON, D. C., *April 9, 1918.*

The SECRETARY OF THE TREASURY,
Washington, D. C.

SIR: I have the honor to submit here with an estimate of appropriation covering an emergency fund for concrete ships and would respectfully request that the same be transmitted to Congress for action.

The Emergency Fleet Corporation of the United States Shipping Board has developed the concrete ship to a point where it is deemed advisable to carry out experiments on a larger scale than the corporation feels its authority warrants without explicit authorization from Congress.

This is recommended in view of the possible advantages in quick construction to be gained should the corporation succeed in developing a thoroughly satisfactory concrete ship.

Respectfully,
EDWARD N. HURLEY,
Chairman

EMERGENCY SHIPPING FUND FOR CONCRETE SHIPS.

For the acquisition or establishment of plants suitable for concrete shipbuilding, or of materials essential thereto, or for enlargement or extension of such plants as are now or may be hereafter acquired or established, and for the cost of constructing, purchasing, requisitioning, or otherwise acquiring such concrete ships, a fund of $50,000,000 is hereby authorized, of which sum $15,000,000 is appropriated for this purpose.

Reprinted from The Official Bulletin, Washington, D. C., April 11, 1918.

CHAMBER OF COMMERCE OF THE UNITED STATES ADOPTS RESOLUTIONS

The Chamber of Commerce of the United States held its sixth annual convention in Chicago, April 10–12, inclusive. Among other resolutions introduced and adopted was the following on concrete ships:

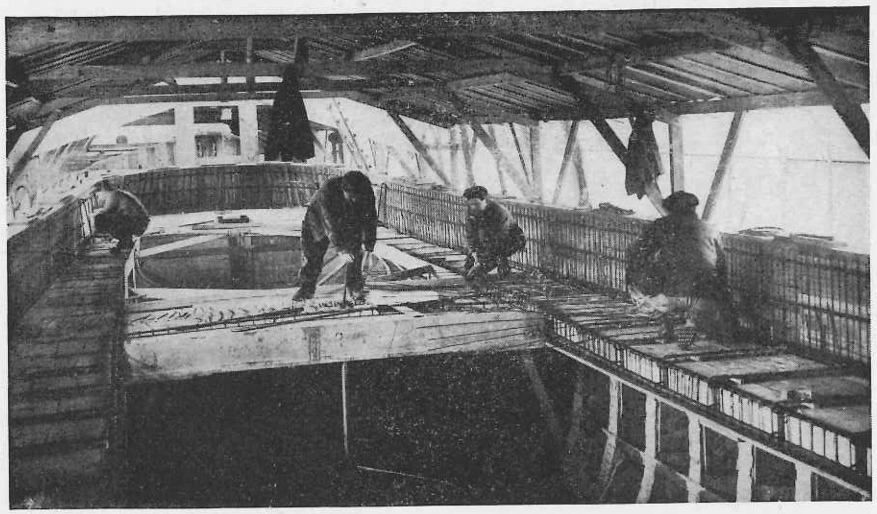
CONCRETE SHIPS

WHEREAS, The Emergency Fleet Corporation has requested Congress to appropriate fifty million dollars for the immediate construction of concrete ships; and

WHEREAS, The need for ships for ocean transport is urgent and critical and must be met quickly by providing ships of all types; and

WHEREAS, Concrete ships can be built quickly of materials readily available, the use of which materials will not interfere with other war needs, and with labor that is obtainable and not likely otherwise to be used in ship construction and with but little preliminary work necessary to provide the plant for the construction of such ships;

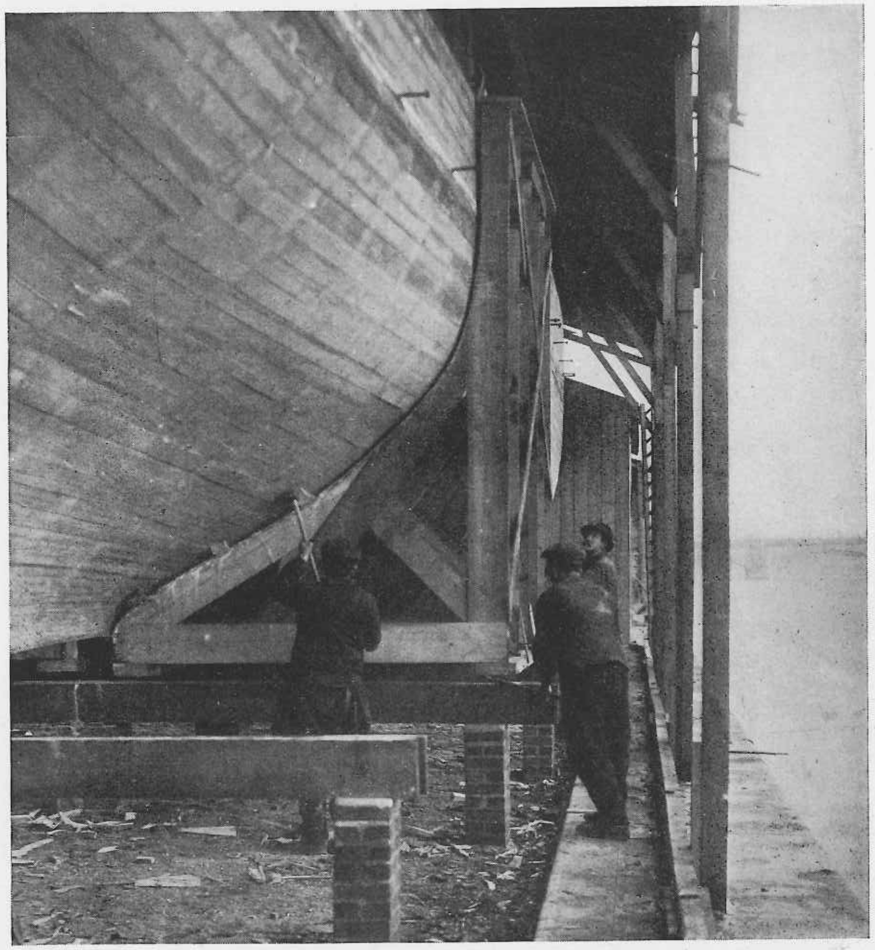
NOW, THEREFORE, BE IT RESOLVED, By the Chamber of Commerce of the United States that the Congress of the United States be urged to approve this appropriation without delay.



Placing reinforcement and securing it in position before setting up the inside mold or form and placing concrete. This also illustrates work in one of the French concrete shipbuilding yards.

CONCRETE SHIPBUILDING IN FRANCE IN 1918

T. J. Gueritte, member of a number of foreign engineering societies and Councillor of the French Board of Trade, read a paper entitled Ferro-Concrete Ships, March 12, 1918, before the Northeast Coast Institution of Engineers and Shipbuilders, at Newcastle-on-Tyne. (Mr. Gueritte's paper appears in full in *Motorship*, N. Y., April, 1918.) Mr. Gueritte has given the subject of concrete ships considerable study and has been associated with concrete shipbuilding in France. A number of pictures in this booklet illustrate various phases of the building of concrete vessels on one of the French inland waterways. In speaking of similar construction Mr. Gueritte says, in the paper referred to:

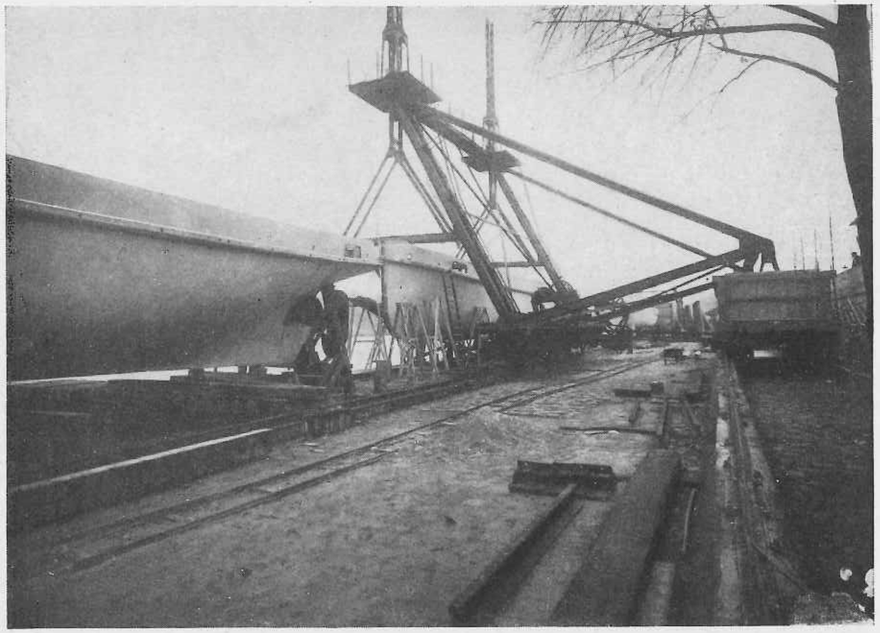


View showing the sectional exterior forms used in one of the French concrete shipbuilding yards. This illustrates form removal after the concrete has properly hardened.

> **"In the construction of a large number of 250 horsepower tugs now being built in France, the author was able to satisfy himself that two weeks were sufficient to erect the moulds (for repeat tugs the erection of the first mould took somewhat longer) and place the steel in position. The process of concreting was occasionally carried out in 48 hours. All told, it is safe to say that in normal working the yard referred to completes a hull in three weeks. The tugs take water broadside on, and an average of three**

weeks is allowed for maturing. With the restricted amount of labor at present available, the said yard can turn out one of these tugs every week, but from explanations given to the author by the yard's manager it is certain that two tugs could be completed every week in normal times. In another place the author has seen in what was four months before a bare field, two 1,000 ton deadweight barges ready for launching, and several others following closely. Barges of that kind, or again, the hulls of small cargo steamers of 1,000 tons deadweight, may easily be turned out and launched at the rate of one every ten weeks from each slip in a well organized yard."

The foregoing is exceptionally interesting in that it confirms the general statements that have been made during the past few months with respect to the speed which may be expected in shipbuilding when concrete is the construction material. Mr. Gueritte said further in his paper:



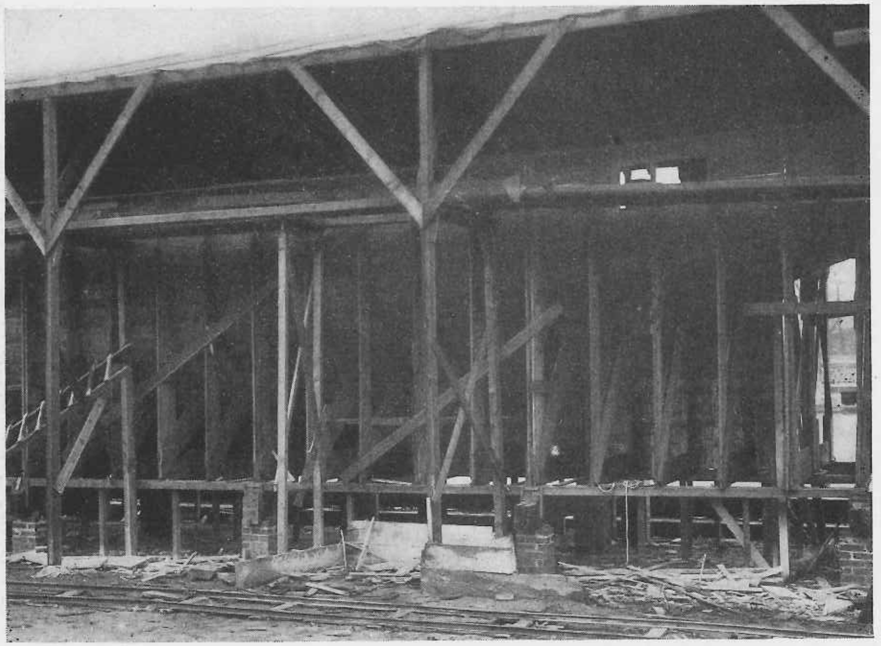
Another view of French concrete shipbuilding, illustrating the manner in which these river tugs are launched. They are lifted from their bed or cradle by a huge steel crane which places them in the water.

"It will be understood that from 3 to 5 weeks have to be added to allow for the maturing of the concrete. In ordinary land work one considers generally that a test load may be imposed upon a new floor 5 or 6 weeks after its completion. But the concrete used in that case is not so rich in cement as for ships, and the richer the concrete the quicker the required strength is attained. It might be possible to utilize that period for partly fitting up the ship instead of waiting until she is afloat, so that the maturing period would not be lost altogether."

REPAIRS TO CONCRETE VESSELS EASY

The following from Mr. Gueritte's paper may be accepted as authoritative opinion of one who has had experience as to the facility with which repairs, if necessary, may be made to concrete vessels:

"Such local damage as may occur in ferro-concrete ships will be most easily repaired, the hole being blocked up by providing a small timber shuttering and filling the hole with new concrete, after having added, if need be, a few strengthening bars. By using a very rich mixture of concrete, the patch will be able to stand the water pressure in a couple of days or even less, and if need be, one may not remove the shuttering before putting to sea again, for further safety. Such a repair may even be carried out under water. Cementing or concreting repairs to quay walls or jetties under water are by no means processes unknown to civil engineers.



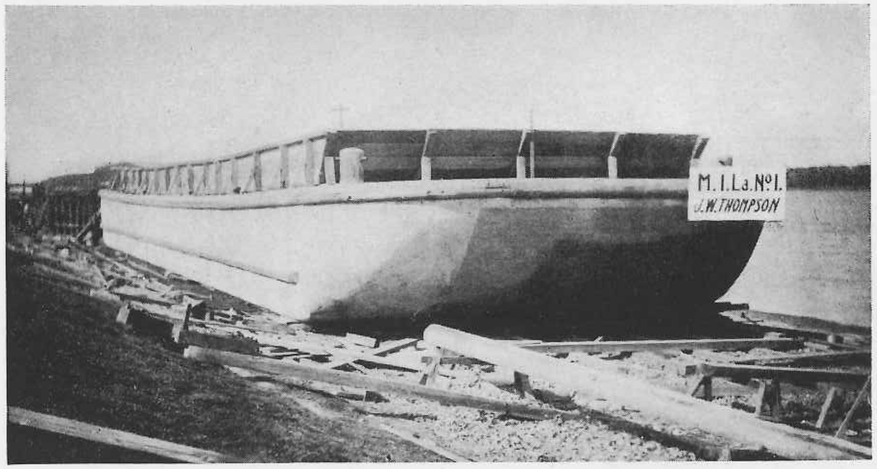
Close view of form details used in a French concrete shipbuilding yard where numerous concrete vessels are now being built. These forms are used on a standardized type of boat which permits them being used again and again in repeating the same design.

"In December last the author had the good fortune (if he may put it that way) to inspect a 1,000-ton barge which a couple of days previously had suffered damage during a faulty launching; it had been repaired as explained above, and was then afloat and in excellent condition. Several instances of damage to river or canal barges in use abroad have been recorded, pointing all to the same conclusion, and all investigators seem agreed that repairs to ferro-concrete ships will be quicker and much cheaper than to steel vessels. Alterations to the design in course of erection, or while the ship is in service, are quite easy. The author has witnessed in France a fairly sweeping alteration in the position and arrangement of hatchways and companions in a vessel nearing completion, which confirms this statement."

ECONOMY OF CONCRETE IN SHIPBUILDING

In discussing the cost of concrete ships, Mr. Gueritte says:

"The saving which can be effected by ferro-concrete in a certain class of vessel is due partly to the saving in steel, partly to the fact that no heavy plant is required for ferro-concrete work, and partly to the fact that the bulk of the labor employed need not be skilled, and is therefore cheaper. But if the last two factors remain the same whatever the size of the vessel, the first is a variable one. To start with it must be stated that the saving in steel is not as great as was wildly claimed at first by superficial designers who had not grasped the difficulties of the problem, a saving of 80 per cent or even more as has been mentioned occasionally seems quite out of the question. Nevertheless the saving exists and in some cases exceeds 50 or 55 per cent, which is not at all negligible.



Reinforced concrete barge, 130 feet by 30 feet by 7 feet 6 inches, 550 tons capacity, built during the winter of 1917–18 by the J. W. Thompson Sand & Gravel Co., New Orleans. This barge is known as the Mila No. 1, and was launched the last week in March, 1918. A companion barge was started as soon as this one was finished and launched.

And in that respect it is as well when comparing figures to note that in ferro-concrete there is no waste of steel in the process of construction, whereas it seems a recognized fact the weight of steel required for building a steel ship is about 10 per cent greater than that of the steel which is finally embodied in the structure, owing to waste in cuts of plates, angles, rivet holes, etc."

ENGLISH BOARD OF TRADE INSTRUCTIONS PRELIMINARY TO SURVEY FOR REGISTRATION OF CONCRETE SHIPS

As concrete ships have compelled recognition, it has become necessary for maritime boards to prescribe some requirements which must be met to admit such ships to survey for register. The marine department of the English Board of Trade has therefore issued through its Secretary, C. Hipwood, the following:

NOTICE TO SHIPBUILDERS AND SHIPOWNERS OF FERRO-CONCRETE SHIPS

The following preliminary instructions are issued for the information of the Builders and Owners of seagoing Ferro-concrete ships and for the guidance of the Board's Surveyors.

These vessels will be required to comply with the requirements of the Merchant Shipping Acts.

All vessels which proceed to sea, except sailing vessels and dumb barges under 80 tons register solely employed in the coasting trade, must be marked with a loadline as required by Section 438 of the M. S. Act, 1894, and Section 7 of the M. S. Act, 1906. The position of the loadline is regulated by the requirements of the Tables of Freeboard (1909), and depends on the strength of the hull.

In order that the authority to whom application will be made for the assignment of a loadline may be fully informed of the structural arrangements upon which the strength of the hull of a ferro-concrete ship depends, full information as to the intended arrangements must be supplied by the builder to that authority, and the vessel must be built under the inspection of the Surveyors of that authority.

The builders of such vessels should accordingly make application for the assignment of a loadline as soon as possible, and in any case before construction is commenced, either to Lloyd's Register, the British Corporation, the Bureau Veritas or to the Board of Trade.

The application should be accompanied by detailed calculations of the strength of the vessel, drawings showing the construction of the vessel and arrangements of reinforcements in detail, and a general specification of the materials to be used and the methods of construction to be followed.

Board of Trade Surveyors are instructed to bring this circular to the notice of all persons building or proposing to build ferro-concrete ships and also to advise the Principal Ship Surveyor as soon as possible whenever preparations for the construction of such vessels are brought to their notice.

When an application for assignment of a loadline has been received, the Surveyors are to exercise a close inspection of the construction of the hull in all its stages, and very full reports should be forwarded to the Board as to the manner in which the work has been carried out in each case.

The loadline disc, and the marks in connection therewith, are to be permanently marked on a steel plate 33 in. x 18 in. x ¼ in., embedded in the concrete flush with the outside and suitably secured.

Instructions of a more detailed character will be issued for the Surveyor's guidance in due course.

If application for assignment of a loadline to an unclassed vessel is made to the Board of Trade, a special fee of £5 will be payable in addition to the prescribed fee for loadline survey in the case of a steel or wood vessel.

(Signed) C. HIPWOOD, Assistant Secretary.

Marine Department, Board of Trade.
January, 1918.

"SHIPS, SHIPS, WE MUST HAVE SHIPS!"

In an interview reported by Edward Marshall in the Washington (D. C.) Sunday Star, April 14, 1918, Sir Joseph Maclay, British Shipping Controller, says:

"Ships, Ships, We must have ships!"

"Tell the workers of America," he added, "of the great necessity for speed. There is no time for mistakes. There is no time for disagreements. There is no time even for discussion.

"Ships will not be useful to us next year unless we first have ships this year. THIS YEAR. Spell the words in capital letters. SHIPS THIS YEAR AND ONLY SHIPS THIS YEAR CAN WIN THIS WAR FOR THE ALLIES.

"All the enemy desires is a delay in the American shipyards and in ours, but especially in those of the United States."

PLAN TO RUSH CONCRETE SHIPBUILDING YARD

The following appeared in the *Official Bulletin:* Washington, D. C., April 16, 1918:

The Shipping Board authorizes the following:

President Wilson has approved an estimate of appropriations for $50,000,000 for the acquisition or establishment of plants suitable for concrete shipbuilding, or "for the enlargement or extension of such plants as are now or may be hereafter acquired or established, and for the cost of construction, purchasing, requisitioning, or otherwise acquiring such concrete ships."

THREE LAUNCHING WAYS PLANNED

The Shipping Board had already planned to construct three launching ways for three 3500-ton concrete vessels, and if these proved to be successful the board had then intended to go to the 7500-ton type. But with this large appropriation in sight Chairman Hurley said that rush work will be immediately begun at the projected plant in Wilmington, N. C.

Senator Duncan U. Fletcher, of the Senate Committee on Commerce, assumed that the matter would be submitted to this committee. The Senator is much impressed with the possibilities of this type of vessel and said that as long ago as January 26 there had been adopted a resolution calling on the Shipping Board to make an investigation of this type and to report on the advisability of its construction.

COST LESS THAN STEEL OR WOOD

"This type," the Senator said, "will cost very much less than either steel or wood construction and will utilize labor and material which is not available for either."

If the matter comes before Senator Fletcher's committee and is reported out for action by the Senate it will then go to the House Committee on Merchant Marine and Fisheries. If it has favorable action there it will then go back to the House, and, if approved, will then be sent to the President for his signature.

SENATOR McCUMBER'S VIEWS

Senator McCumber, of North Dakota, who had started a fight for concrete-ship construction soon after our entrance into the war, said he hoped that Congress would make no delay in appropriating the $50,000,000 that has been asked for. "This appropriation," he said, "has been approved by the President, by the Shipping Board, and by experts. There should be no delay in granting it, and no delay in rushing work on this new type. In building yards and shipways for this type I hope that the Shipping Board will concurrently get out designs for the 7500-ton type, and that the designs will be ready as soon as the plants are.

IMPRESSED BY POSSIBILITIES

"I have talked with experts in regard to this type and I must confess I am very much impressed by its possibilities. If we take up the building of it and on a large enough scale I believe that we can put 5,000,000 deadweight tons afloat by January 1 of next year.

"I wish to congratulate Mr. Hurley and the Shipping Board upon the great energy it is displaying in the matter of building ships, and I am sure that there will be no delay in building concrete ones when this appropriation has been made available."

CONCRETE SHIPS WILL HELP TO SOLVE THE SHIPPING PROBLEM

France, Italy, Spain, England, Denmark, Norway, Sweden, Holland, and, if reports be correct, Germany, are solving some of their shipping problems by turning to concrete. Concrete permits speed. We must have ships — lots of them — NOW! Concrete ships will help to solve the shipping problem.

Note: With the exception of the illustration shown on page 8, the pictures in this booklet are from the Gilliams News Service.

SAVE
W.S.S.
WAR SAVINGS STAMPS
ISSUED BY THE
UNITED STATES
GOVERNMENT
SERVE

THE Portland Cement Association is endeavoring to collect all information on developments that are taking place in the use of concrete for barges, lighters and ships.

It has also collected names and addresses of firms and individuals engaged or interested in the design and construction of concrete ships and barges.

We shall be glad to place at the disposal of those interested any such information now on hand or that may be collected subsequent to the issue of this booklet.

Concrete for Permanence

PORTLAND CEMENT ASSOCIATION

Offices at

ATLANTA
CHICAGO
DALLAS
DENVER
HELENA
INDIANAPOLIS
KANSAS CITY
MILWAUKEE
MINNEAPOLIS
NEW YORK
PARKERSBURG
PITTSBURGH
SALT LAKE CITY
SAN FRANCISCO
SEATTLE
WASHINGTON, D. C.